

Dissertation thesis. Role of genetic factors in the etiopathogenesis of selected diseases of the oral cavity

Author. Petra Bořilová Linhartová

Brno 2014

Abstract

Background. Genetic factors play an important role in the etiopathogenesis of many diseases affecting the oral cavity. Genetic analysis of candidate loci was conducted in the most common oral diseases: dental caries, periodontitis in patients with/without diabetes mellitus and root resorption (EARR) after orthodontic treatment.

Methods. The thesis comprises a set of eight studies (six already published articles and two articles submitted for review) and two unpublished manuscripts prepared for submitting. With the exception of one systematic review, all articles were designed as case-control studies. Genetic analysis was based on the polymerase chain reaction principle (PCR).

Results. While the genetic determination of dental caries did not confirm a significant association between single nucleotide polymorphism (SNP) in the lactotransferrin gene and caries development and/or severity, allele 2 in interleukin-1 receptor antagonist (IL-1RN) proved to be a risk for EARR in girls ($P=0.02$). No significant associations between alleles, genotypes or haplotypes of the selected SNPs in the IL-18 gene and chronic periodontitis were found; similarly frequencies of 2 SNPs in the apolipoprotein E gene did not differ significantly between patients with CP and controls. However, increased levels of low-density lipoprotein (LDL) and total cholesterol were measured in patients with CP vs. healthy controls ($P<0.05$). Further, the effects of IL-4 polymorphisms on production of some cytokines, e.g. interferon-, IL-10, IL-1 and IL-1, tumor necrosis factor- and IL-6 after stimulation with heat shock protein 70 or selected parapatogens (from $P0.001$ to $P0.05$) were observed in patients with CP. Some IL-8 haplotypes seem to be protective against the CP development and also some IL-8 SNPs affected the occurrence of specific bacteria in subgingival sulcus in the healthy controls ($P<0.01$), periodontal pockets in patients with aggressive periodontitis (AgP, $P<0.02$) or in patients with CP ($P<0.05$). Within the analysis of polymorphisms in the IL-1 gene cluster, some haplotypes were associated with CP and type 1 diabetes melitus (T1DM) with/without CP ($P<0.05$).

Conclusions. Although the relationship between some polymorphisms in the genes for immunoregulatory factors and selected diseases of the oral cavity in the Czech population was found, the complex nature of these diseases requires further study, combining genetic analyses and following clinical, microbiological and biochemical tests.

Keywords dental caries - root resorption - periodontitis - diabetes mellitus - case-control study - gene variability - lactotransferrin - interleukins - apolipoprotein E